CLAIMS

I/We claim:

[c1]   1.   A method for creating a searchable library of classifications of image features, the method comprising:

receiving a digital image of a physical object;

automatically generating a multi-dimensional surface model from the received digital image of the physical object, and which differs from the received digital image;

providing an output that displays the generated multi-dimensional surface model;

manually analyzing the generated multi-dimensional surface model to determine selected features of the received digital image;

classifying the determined features;

storing the feature classifications;

creating an algorithm for locating classified features in surface models of physical objects based on the stored classifications; and

storing the algorithm.

[c2]   2.   The method of claim 1 wherein the received digital image has eight bits of image intensity information.

[c3]   3.   The method of claim 1 wherein the received image has more than eight bits of image intensity information.

[c4]   4.   The method of claim 1 wherein the generated multi-dimensional surface model includes information that is not plainly discernable in the received image.

[c5]   5.   The method of claim 4 wherein intensity transitions in the received image are represented in the generated surface model by changes in color.

[c6]   6.   The method of claim 4 wherein intensity transitions in the received image are represented in the generated surface model by changes in surface heights.

[c7]   7.   The method of claim 1 wherein the analyzing is done automatically.

[c8]   8.   The method of claim 7 wherein the analyzing is done by a learning algorithm.

[c9]   9.   The method of claim 8 wherein the learning algorithm is a neural network.

[c10]   10.   The method of claim 8 wherein the learning algorithm is a genetic algorithm.

[c11]   11.   The method of claim 1 wherein the classifying is done heuristically.

[c12]   12.   The method of claim 1 wherein the classifying is done manually.

[c13]   13.   The method of claim 1 wherein the feature classifications include temporal classifications.

[c14]   14.   The method of claim 1 wherein the created classifications are based on a probability that features identified in accordance with the classifications distinguish the physical objects the digital images represent.

[c15]   15.   The method of claim 1 wherein the algorithm includes rules for identifying features.

[c16]   16.   The method of claim 1 wherein the created classifications are associated with the received digital images.

[c17]   17.   The method of claim 1 wherein the created classifications include features relating to fingerprint analysis.

[c18]   18.   The method of claim 17 wherein the physical object is a fingerprint.

[c19]   19.   The method of claim 1 wherein the created classifications include features relating to odontology.

[c20]   20.   The method of claim 19 wherein the physical object is a tooth.

[c21]   21.   The method of claim 1 wherein the created classifications include features relating to oncology.

[c22]   22.   The method of claim 21 wherein the physical object is a human cell.

[c23]   23.   The method of claim 1 wherein the created classifications include features relating to weld analysis.

[c24]   24.   The method of claim 23 wherein the physical object is a weld.

[c25]   25.   The method of claim 1 wherein the created classifications include features relating to baggage screening.

[c26]   26.   The method of claim 25 wherein the physical object is an article of baggage.

[c27]   27.   The method of claim 1 wherein the created classifications include features relating to geo-spatial mapping.

[c28]   28.   The method of claim 27 wherein the physical object is an object being mapped.

[c29]   29.   The method of claim 1 wherein the created classifications include features relating to gemology.

[c30]   30.   The method of claim 29 wherein the physical object is a gem.

[c31]   31.   A method for creating a computer-searchable library of image features, the method comprising:

> receiving a digital image having an arrangement of pixels, wherein each pixel in the arrangement has a value of more than one bit;
>
> automatically generating a multi-dimensional surface model from the received image that visually enhances transitions in values of adjacent pixels in the digital image;
>
> analyzing the generated surface model to determine features of the received image in accordance with predetermined classifications to identify classified features in the digital image; and
>
> storing the classified features in a database.

[c32]   32.   The method of claim 31 including storing the received image with associated classified features.

[c33]   33.   The method of claim 31 including storing the generated surface model with associated classified features.

[c34]   34.   The method of claim 31 wherein the automatically generating includes creating a pseudo three-dimensional image having varying edges, heights and surfaces based on transitions in values of adjacent pixels in the digital image.

[c35]   35.   The method of claim 31, further comprising:
automatically creating a two-dimensional image representing a set of the classified features and relative distances between each of the classified features in the set, wherein the two-dimensional image contains fewer image features than either the digital image or the surface model; and
storing the created two-dimensional image in the database.

[c36]   36.   The method of claim 31, further comprising:
automatically creating a set of the classified features and distances between each of the classified features in the set, wherein the set contains less data than either the digital image or the surface model; and
storing the created set in the database.

[c37]   37.   The method of claim 31 wherein the visual enhancement includes varying edges.

[c38]   38.   The method of claim 31 wherein the visual enhancement includes varying surface heights.

[c39]   39.   The method of claim 31 wherein the visual enhancement includes varying colors.

[c40]   40.   The method of claim 31 wherein the automatically generating includes creating a pseudo three-dimensional image having varying edges, heights, surfaces, and colors based on transitions in values of adjacent pixels in the digital image.

[c41]   41.   A method of analyzing a source image, comprising the steps of:
generating a source image data set comprising display data and location data, wherein
the location data indicates the location of the display data with reference to a two-dimensional coordinate system, and
the display data is used to reproduce the source image;
generating a surface model based on the source image data set, wherein
the surface model is derived from location data corresponding to the location data of the source image data set and intensity data generated based on the display data; and
analyzing the surface model to determine features of the source image.